DETHEN MEDICAL IOURNAL VOLUME 282 3 IANTIARY 1981

PRACTICE OBSERVED

Practice Research

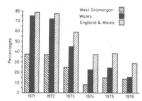
Effect of a low pertussis vaccination uptake on a large community

REPORT FROM THE SWANSEA RESEARCH UNIT OF THE ROYAL COLLEGE OF GENERAL

Pertussis vaccination was started by several local authorities in 1942 but it was not until 1957 that it was introduced on a national scale. The number of notifications of whooping cough in England and Wales dropped from 85 004 in 1957 to 8913 in 1975. The three or four yearly peaks of notifications also became smaller, and the last and smallest was in 1974-5. If the trend had continued the next peak would probably have been even smaller. On the contrary, it was the biggest peak of notifications for whooping cough for over 20 years.

In 1974 a good deal of adverne publicity was not the In 1974 to good deal of adverne publicity was not on the attitude of parents to this type of vaccination, and there was evidence that the attitude of some doctors had also changed. A preliminary inquiry carried out in 1976 showed that out of 100 general practitioners known to be good recorders, one-third had given up pertussis vaccination, one-third were leaving the decision to the parents, and the remainder were still vaccinating as they had done before. The first effect of this general change of attitude was a marked drop in the acceptance rate for pertussis vaccination. In England and Wales, for example, the acceptance rate fand dropped from 185% for example, the acceptance rate for pertussis vaccination. In England and Wales, for example, the acceptance rate Glamorgan, where the rate had not only dropped to 95% in children born in 1974 but in 1971 was even less than half the average for England and Wales (fig 1).

Working party: Dr W O Williams, director, Royal College of General Practitioners' Research Unit (University College of Swannes); Dr W consultant Interropolity, West Glancopan Area Health Authority, Miss L Burtell-Davis and Mr R Dalds, statistical and computer advisers, Medical Sociology Research Contro, University College of Swannes.



Method

All the doctors with patients within the boundaries of West Glasnosgan (population 360 000) were asked to participate by notifying cases of whooping cough by telephone to the Swanse Public Health Laboratory, and these were in turn notified to the local authority. All the media for the bacteriological investigations were prepared at this laboratory, but the investigations were carried out there and at the Neath Center Hospital Laboratory. Cultures were sent to a superior of the control of the Neath Center Hospital Laboratory. Cultures were sent to questionnaire was designed to obtain information on social status, clinical pattern, results of laboratory investigations, immunisation details, etc, for each notified case and other members of the bousehold.

chails, etc, for each notation of the same day as the notifications were received one of five pecially trained nurses visited the household and started filling in

BRITISH MEDICAL IOURNAL VOLUME 282 3 IANUARY 1981

"Aged 11 months—Went blue and stiff, couldn't get his breath. Thought he was dead. Put on lap, beat his back, couldn't open his mouth, prised it open. Stuck her fingers down his throat to bring up phlegm. Thought it was a fit, but realised that it was an inability to breath—only lasted seconds but seemed ages.

COMPLICATIONS

Death—Three children who had whooping cough died. Their ages were 4 months, 5 months, and 134 months, and the illness had lasted 2 weeks, 1 week, and 8 weeks respectively. The first two were found dead in bed, and a necropy examination was carried out on the trackes of one of them. In the other the pathologist's comment was—"the chincal history coughed with the histologist's comment was—"the chincal history coughed by the persent of the third-while, of an encephalistis or a cerebral thromboats following whooping cough. This child had a meniagemyelocel repaired shortly after birth and had a history of fits with several admissions to hospital since the age of 6 months. The child who was 5 months old had received one does of the complication—"The commonents complication was loss of weight, occurring in 385 cases (16-8). There were 224 cases (9-8°.) of acute bronchits, eight cases of attackcass, and 18 cases complicated by bronchopeneuma. It resurptives even the complication of the complication was shortly as the control of the complication of the

SIGNIFICAL ADMISSIONS
SIXTy-four Children were admitted to hospital; all except one were
under 5 years, and 30 were under 12 months. A far higher proportion
was admitted from the lower social class groups than was present
in the index households; of the hospital cases, 33%, were in social
class V compared with 9%, in the index households. The severity of
uncerhabilities—one of them died and the other was on the "danger
interior for the days," five had convolutions; seven had preumonis; 19 had
acute bronchitis; and two had atelectasis. None of the children
needed assisted evinition, but 24 needed aspiration and 25 special
nursing. Ten children were given oxygen. One child suspected of
having meningistives say given a lumber puncture.

RELEVANCE OF VACCINATION AND AGE

Significantly more children under five years of age were fully vaccinated in the control (11-2%) than in the index group (6 6%). In the older age groups the vaccination state was similar in the control (42-2%) and index (44-2%) groups. The secondary attack rate (table (42-2%) and index (44-2%) are secondary attack rate (table 142-2%) and index (44-2%).

g cough	whooping cough	Total	Protection
Acres w	nder 5 wars		
6-3 - 3	260 (61.7%)	406	48.7°.
		98	χ' = 29·8 0· 0·001
4	ent 5-9		
26*) "	23 (27.4%)	84	21 4"
85.0	85 (21 5 %)	395	x1=1:05 NS
	April 10 6-3*) 7-3%)	Aged under 5 years 63°, 260 (637°, 273°, 32 (327°, 273°) 7.3°, 32 (327°, 273°) Aged 5-9 26°, 23 (27.4°, 273°)	Aged under 5 years 6 3°, 260 (63.7°, 408 7.3°, 32 (32.7°, 98 Aged 5-9 25 (27.4°, 84

NS - Not significant

11) was 32.7% in fully protected children under four years of age compared with 63.7% in the unprotected. The protection rate ([637--32,76)75 vol 00) was only 49%. The study showed that the illness lasted two weeks longer in the unvaccinated and that their symptoms were more severe. Voniting and weight loss were appreciably more common in those who had not been vaccinated under the compared with the compared with the compared with a several process and as an inverse correlation of severity of symptoms with age, the younger the child the more severe the symptoms.

There was a significant difference in the solution rate of B pertuns in the unvaccinated (44.2%) compared with the fully vaccinated (26.7%) (vf = 49.56). The number fully vaccinated under 12 months was too small to show differences in this age group.

SOCIAL CLASS

The social class (table III) showed a close similarity in the index and control households. Age patterns and number of bedrooms were also mailar in the two groups. There was a small difference in bedroom occupancy (index 141, control 154 persons per bedroom) (index 141, control 154 persons per bedroom) (fee were also slightly more owner-occupiers among the index (69°%) than the control household (20°%) (pc 059).

TABLE III-Social class of index and control of households

Social class	Index h	ouscholds	Control househo		
	No	٠.	No	75	
1	100	6.8	19	6.3	
11	307	20-9	55	18-3	
111	706	48-1	144	48-0	
iv	225	15-3	47	15.7	
	129	8-8	35	11-7	
Missing data	2	0.2			
Total	1469	100-1	300	100-0	

Discussion

It is most likely that the low rate of immunisation in West Glamorgan caused an appreciable drop in herd immunity even before the adverse publicity to the vaccine in 1974 had taken effect. The sudden drop in vaccination that followed made the population of West Glamorgan even more vulnerable to whooping cough and contributed to the magaintude of the next outbreak. It is expected that a low herd immunity to whooping cough would result in an increase in incidence of the disease. It is not surprising, therefore, that not only was the peak incidence of the 1974-5 outbreak twice as big as that expected but also that the next outbreak starting in 1977 was very much larger, doctors in West Glamorgan had been encouraged to notify cases of whooping cough, and this may have contributed somewhat to the number of notifications. Furthermore, 2711% of the notified cases were not considered to be true whooping cough. If these were excluded from this peak the epidemic would still have been large. In such epidemics more doctors make notifications as they become aware of the existence of an outbreak. This was true in West Glamorgan are according to the existence of an outbreak. This was true in West Glamorgan as a rist of children becoming apnote; inhaling womit, or having a convulsion when the parents were asleep. Two children died unexpectedly during the night. The descriptions given by the nurser reflect the fortifude shown by these parents in the face of serious and distressing crises.

The large number of children who had lot weight illustrates the debitating effect of the disease, expectedly when it lasted of the disease of the children declination of the children additional content of the children and the way of the part of the disease of the children and intensing crises.

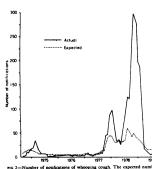
24

the questionnaire. She shio collected permanal swabs from the notified (index) case and any other member of the household with symptoms. If the swabbing precipited is pureya with the property of the propert

SIZE AND PATTERN OF THE EPIDEMIC

SIZE AND PATTERN OF THE EPIDEMIC

The epidemic started in October 1977, and the study was started in November, Notifications reached the first peak in January 1978 and the second, very much higher peak in November 1978. By the middle of March 1979, the epidemic was absuing. Whooping cough continued to occur, however, throughout the rest of the year with a higher incidence than in the previous distainest of whooping cough a month in the whole of West Glamorgan for 1974-9. It shows the staye for the 1977-9 epidemic compared with that of 1974-5. It also shows the expected number of nonficiations for Wast Glamorgan scalculated from the number of nonficiations for England and Wales and the population ratios between the two areas.



r of notifications of whooping cough. The expected number is shown for West Glamorgan is calculated from the number is for England and Wales and the population ratios between

BRITISH MEDICAL IOURNAL VOLUME 282 3 JANUARY 1981

The total number of households with suspected cases of whooping cough was 2001. Nurses were refused admission in 15 houses, leaving 1986 households that were studied in detail. Of the 3148 cases investigated, 853 (271%) were excluded on the grounds mentioned above. The final analysis consisted of 1469 households with 6104 occupants. There were 2295 cases of clinical whooping cough, of whom 905 were confirmed by the iolation of Borbeital persuas.

There was a slight preponderance of girls $(51\cdot7^\circ_{\circ})$ except in the under-5 age group where there was a slight male preponderance $(51\cdot6^\circ_{\circ})$. The majority of cases $(54\cdot6^\circ_{\circ})$ diver under the age of 5 (table I). There were 235 adults over 20 years of age with whooping $\cos h_{\circ}(7)$ of the clinical cases.

TABLE 1—Incidence of whooping cough according to age at first and second onset and total incidence

Age (years)	First onset		Second onset No		Total No	
		67.9	78	32.1	243	10.6
a	165					
	189	68 2	88	31.8	277	12-1
2	208	77-6	60	22 4	268	11/7
3	344	88:4	45	9-2	389	16-9
4	294	91.0	29	40	323	141
5-0	359	77:0	107	23.0	466	20
10-14	51	61 4	32	38 6	83	3.4
15-19	13	61.9	- 8	38 1	21	0.9
20 -	99	42 1	136	57.9	235	10-3
Total	1722	75-0	583	25 0	2305	100 4

The commonest source of infection of first-onset cases was "at school" (195%) followed by "another house" (187%), "at work" (23"%), and in 195% the source was unknown. Most first-onset cases were 3 and 4 years old (table 1). The highest incidence of secondary-onset cases were in children under 3 years.

CLINICAL PICTURE

CLINICAL PICTURE

The illness started with a dry, irritating cough in 70°, of cases, and this was usually followed by a catarrhal stage. Catarrh was the first symptom in only 22.1°, of cases. As the illness progressed coughing became worse at sught in 88°, of patients. The paroxyma of coughing were described by one adult sufferer as "coughing one sught and the coughing were described by one adult sufferer as "coughing were described by one adult sufferer as "coughing were described by one adult sufferer as "coughing were particular percentage of coughing were followed by womting in 60° 3°,. Feeding preceiptated a paroxym in some children, and if the paroxyma were very frequent they failed to take in enough food and fluids daily. These factors, counting which of 187°, of coccurring in 430 (187°), cases.

The symptoms were often frightening for the children and their parents, especially when the children had convoluents, cyanonis, or approach. One father gave his 4-year-old daughter mouths the was ground to defer a comparent of the was ground to the sufficient of the sufficient

mitted to hospital had been vaccinated. Two of the children safanited developed encephalitis but had not been vaccinated because they had a history of fits. The only way the risk to such children can be reduced is by maintaining good herd immunity. Children who are too young to be vaccinated are also at great risk if their older brothers and susters have not been vaccinated and bring the infection home from school. This problem was shown clearly in this study.

This problem was shown clearly in this study.

The first of the problem was the study of the study of

whooping cough; four babies developed wnoupung was units way.

In Britain we vaccinate to protect the individual who is vaccinated, but if a sufficient number accept vaccination we also have the bonus of a good herd immunity. This in turn will contribute to the protection of those who are too young to be vaccinated and those in whom vaccination is contraindicated.

A large epidemic of whooping cough broke out in a community of 360 000 people, where the pertussis vaccination acceptance rate had fallen to 95°., Out of 229° casee described as whooping cough, 90° were confirmed bacteriologically. Two of the children who died were "out deaths." The disease was more severe and lasted longer in younger children and in those who had not been vaccinated.

BRITTH MEDICAL JOURNAL VOLUME 282 3 JANUARY 1981
We thank the research nurse, the raff of the two participating laboratories, especially Mr Berian James and Mr Keith George and the two unit secretaries Mr Anne of enfiths and Mrs Phyllis Sauders, all of whom did more than their call of duty to make the study a success. We also thank the general practitioners for notifying the access. We also thank the general practitioners for notifying the Health Authorny, including the health viators who helped in the eatlier part of the study; and Dr N W Person for confirming and typing the specimens. Professor Knoweldon gave valuable help and advice throughout the study. Thanks are also due to Dr Margaerite Mrs. Finally, the unit is very grateful to the Department of Health and Social Security for the generous grant, without which this study would not have been possible.

Requests for reprints should be sent to the RCGP Research Unit Cumbrid, Swanzea, Health Centre, Cachrichs Road, Combovila, Swanzea.

References

References

Toperatment of Health and Social Security: Joint Committee on Vaccination and Immunisation. Review of the readence on subsequences could be continued to the Marko, 1977.

Williams WO, Doids R. Validation of sources of pertuasia immunisation Lindon. Security of the Commission of the Commi

This knowledge of diffacles does not depend fo much upon fairntific principles as many imagine. It is chiefly the refull of experience and other axion. By strending the fact, and carefully obleving the various occurrences in diffacles, a great degree of securacy may be acquired, both in diffungationing their fyrmproms, and in the application of medicines. Hence fentible gurfes, and other perfors who wait upon the fact, often difforer a differed from than those who have been bred to plytife. We do not however mean to infinuse that a medical education is of no use. It is doubtlefs of the greated importance; but it never can fupply the place of observation and experience.

As many of the indications of cure may be answered by diet alone, it is always the first thing to be attended to in the treatment of diseases. Those who know no better, imagine that every thing whish goes by the name of a medicine polielles some wonderful power or server tharm, and think, if the patient wallows enough of drugs, that he must do well. This mittake has many ill consequences. It makes people truth to drugs, and neglect their own endeavours; brides, it diffectiourages all attempts to relieve the fick, where medicines cannot be obtained.

courages all attempts to relieve the fick, where medicines cannot be obtained.

MEDICINES are no doubt ufeful in their place, and, when administered with prudence, they may do much good; but when they are put in place of every thing elfe, or administered at random, which is not feldom the cufe, they mult do milchied. We would therefore with to call the attention of mankind from the purfain of feeret medicines, to fush things at they are acquainted with. The proper regulation of their may often do much good, and there is title danger of their ever doing burn.

(Buchan's Domestic Medicine, 1786.)